

PATENT ABSTRACTS OF JAPAN

(11) Publication number : 06-261316

(43) Date of publication of application : 16.09.1994

(51) Int.Cl.

H04N 7/15

H04L 12/18

H04M 3/56

(21) Application number : 05-044859

(71) Applicant : NIPPON TELEGR & TELEPH CORP <NTT>
TOSHIBA CORP

(22) Date of filing : 05.03.1993

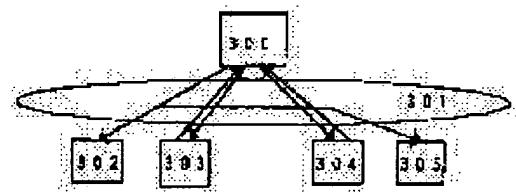
(72) Inventor : WAKAHARA TOSHIHIKO
UNEMOTO KAZUO
KINOSHITA MASAMI
NAKAJI TOSHIYUKI

(54) COMMUNICATION CONFERENCE SYSTEM AMONG MULTI-SPOTS

(57) Abstract:

PURPOSE: To reduce the cost of communication and to screen-display the interactive situation of a speaker so that it can easily be understand on a communication conference system among multi-spots, by which communication is mutually made with plural video terminal groups installed at remote places through a node for inter-multi-spot communication.

CONSTITUTION: When displaying the speaker, bi-directional lines are not always set between terminals 302-305 participating in a conference and an inter-multi-spot television conference controller 300 but one-direction lines are set for attendants except for a person who frequently speaks, and speaking control is executed. The bi-directional line is additionally set only for the terminal whose right to speak is acknowledged and the right to speak is transferred to the other terminal when speaking is terminated. The bi-directional line which is additionally set is cut and the line is set to the other speaking terminal. Not only the video of the speaker but



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also the video of the chairman or the previous speaker is synthetically displayed.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of
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[Kind of final disposal of application other than
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[Date of final disposal for application]

[Patent number]

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CLAIMS

[Claim(s)]

[Claim 1] The multimedia circuit containing two or more images, voice, and data is set up between two or more television conference terminal group and the processor for the teleconferences between many points. Between the television conference terminal group and the processor for the teleconferences between many points In the teleconference system between many points which changes and distributes the video signal from the camera of one terminal in a television conference terminal group, carries out addition processing and distributes the sound signal from the microphone of the television conference terminal A means to set up a unidirectional and a bidirectional circuit between said television conference terminal group and said processor for the teleconferences between many points, The sound signal of said television conference terminal group all in said processor for the teleconferences between many points A voice addition distribution means to add and distribute, An N-1 addition distribution means to add and distribute voice other than a self-terminal, and a means to detect the utterance demand when the terminal of said television conference terminal group has an utterance demand, The utterance control means which presupposes that an utterance demand is possible to one or more television conference terminals chosen from among the detected utterance demands, and notifies good/failure of an utterance demand, The means which carries out the call setup of the bidirectional circuit to the television conference terminal made possible [an utterance demand], A means to notify and add the voice of the television conference terminal made possible [an utterance demand] to said voice addition distribution means and said N-1 addition distribution means, The means which receives the notice of utterance termination, and carries out call control so that said added bidirectional circuit may be cut and it may return to the original cross connection when an utterance is completed, While thinning out the pixel of the video signal of said utterance terminal and one video signal in said television conference terminal group, or one signal in the image of the last utterance terminal and reducing The teleconference system between many points characterized by having a means to compound these video signals and to distribute to said television conference terminal group.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Industrial Application] This invention relates to the teleconference system between many points which communicates mutually through two or more image terminal groups installed in remoteness, and the node for the communication link between many points.

[0002]

[Description of the Prior Art] The example of a configuration of the conventional television conference control unit between many points is shown in drawing 9 (A) at the example of the conventional television conference system between many points, and drawing 9 (B).

[0003] In drawing 9 (A), in 101,102,103,104, a television conference terminal and 110 express a digital communication network, and 111 expresses the television conference control unit between many points. Each television conference terminals 101-104 set up 64 kb/s digital bidirectional circuits, such as 2B+D, between the television conference control devices 111 between many points, and an image and a sound signal are delivered and received to each other between each terminal, and they perform a teleconference in this configuration. Here, digital communication networks 110 are communication networks, such as INS net.

[0004] The configuration of the television conference control unit 111 between many points is shown in drawing 9 (B). this drawing -- setting -- 201,202,203,204 -- a circuit interface and 211,212,213,214 -- in the image change distribution section and 232, the voice addition distribution section and 241 express the call control section, and 242 expresses [image coding / decryption section and 221,222,223,224 / voice coding / decryption section and 231] a control section.

[0005] In this configuration, bidirectional digital circuits, such as 64 kb/s, are set up based on the directions from the call control section 241 between each terminals 101-104 and the circuit interfaces 201-204.

[0006] It is separated by the circuit interface 201 and the image and sound signal from the television conference terminal 101 are decrypted in image coding / decryption section 211 and voice coding / decryption section 221, and based on the directions from each terminal, a video signal is the image change distribution section 231, and is changed to one video signal of the television conference terminals 102-104. With this, N-1 addition adding voice other than the end of a local is performed in the voice addition distribution section 232. While the changed video signal is again encoded in image coding / decryption section 211 and being transmitted to the circuit interface 201, it encodes in voice coding / decryption section 221, and it is transmitted to the circuit interface 201, and a sound signal is multiplexed, and is transmitted to the television conference terminal 101.

[0007] Actuation with the same said of circuit correspondence of the circuit interfaces 202-204 is performed. With in addition, the number of terminals which takes out directions to the call control section 241, or participates in this multi-point meeting in a control section 242 based on the meeting setting demand from the television conference terminal 101 so that cross connection of other television conference terminals 102-104 may be performed The amount of loss insertion of the voice addition

distribution section 232 is changed, or it changes to the image change distribution section 231 by the speaker detection function by the voice level monitor in the voice addition distribution section 232, and directions are issued, and it points so that a speaker screen may be displayed.

[0008]

[Problem(s) to be Solved by the Invention] As explained above, by the conventional video conference system between many points, the bidirectional circuit was always set up between each terminal and the television conference control unit between many points, and since the sound signal and the video signal were always transmitted to the television conference control unit between many points from the terminal which has not spoken, or the terminal which is not seen, respectively, there was a problem that the utilization ratio of a transmission line was low. Moreover, since only the speaker was displayed when a speaker change was performed, there was a problem that a dialogue with a chairman and relation with a former speaker were unclear.

[0009]

[Means for Solving the Problem] In order that this invention may solve the above-mentioned technical problem, it is the thing which enabled it to use a communication network efficiently using the uni-directional circuit of communication networks, such as broadband ISDN, and its distribution frame. While being and using a uni-directional circuit setting up function for the television conference control unit between many points By controlling assignment of those who introduce an utterance control function and speak, displaying a speaker or giving a synthetic indication of a chairman or the former speaker, a uni-directional circuit is used effectively and a screen display of a speaker's dialogue situation is carried out.

[0010]

[Function] Since a bidirectional circuit is always set up in a speaker's display in the teleconference system between many points of this invention between the terminal which participates in a meeting, and the television conference control unit between many points While setting up a uni-directional circuit in addition to those who speak that there is nothing and frequently So that the bidirectional circuit which yielded and set the voice additionally to other terminals may be cut if only the terminal with which utterance control was performed and the voice was accepted sets a bidirectional circuit additionally and an utterance finishes it, and cross connection may be carried out to other utterance terminals It carries out and is made to give a synthetic indication of the image of not only a speaker's image but a chairman or a former speaker.

[0011]

[Example] Hereafter, a drawing explains one example of this invention. Drawing 1 is drawing showing one example of a connection configuration with a communication network in the television conference between many points of this invention. Hereafter, it explains according to a drawing.

[0012] In drawing 1 , in 300, the television conference control device between many points and 301 express a digital communication network, and 302,303,304,305 expresses a television conference terminal. Here, although the image and the sound signal are bidirectionally transmitted and received towards the television conference control device 300 between many points from the television conference terminal 303 and the television conference terminal 304, at the television conference terminal 302 and the television conference terminal 305, the image and the sound signal are only received from the television conference control device 300 between many points. In addition, about the data signal, a bidirectional packet circuit is set up between each television conference terminals 302-305 and the television conference control unit 300 between many points, and two-way communication is possible if needed.

[0013] the example of a configuration of the television conference control unit [in / in drawing 2 / this invention] 300 between many points -- being shown -- 306,307,308,309 -- a circuit interface and 311,312,313,314 -- image coding / decryption section and 321,322,323,324 -- voice coding / decryption section and 331,332,333,334 -- in a control section and 351, the image change distribution section and 352 express the voice addition distribution section, and 353 expresses [the data transceiver section and 341 / the call control section and 342] an utterance control section.

[0014] In the configuration of drawing 2, using layer 3 extension of the call control protocol of ISDN, as shown in drawing 1, to a digital communication network 301, a bidirectional circuit is set up among the television conference terminals 303 and 304, and the call control section 341 sets up a uni-directional circuit among the television conference terminals 302 and 305, are the circuit interface 307,308 and the circuit interface 306,309, respectively, and does multiplex and separation of it at each media of an image, voice, and data.

[0015] Therefore, after being separated by the circuit interfaces 307 and 308, decrypting the video signal from the television conference terminals 303 and 304 in image coding / decryption sections 312 and 313, respectively and changing it in the image change distribution section 351, it encodes in image coding / decryption section 311,312,313,314, and with the circuit interface 306,307,308,309, it is multiplexed with other signals, is modulation-code-ized, and is transmitted to each terminal.

[0016] On the other hand, the sound signal from the television conference terminals 303 and 304 The circuit interface 307 It dissociates by 308, and after being decrypted in voice coding / decryption sections 322 and 323, it is added in the voice addition distribution section 352. To the television conference terminals 303 and 304, this addition signal from this addition signal at the television conference terminals 302 and 305, respectively and one's sound signal It encodes in voice coding / decryption section 321,322,323,324, what was subtracted (N-1 addition) is multiplexed with the circuit interface 306,307,308,309, and it transmits to each terminal.

[0017] moreover, when the television conference terminals 302 and 305 make the remark of a question etc. An utterance demand command is made into a data signal, respectively. After it sends out to the television conference control device 300 between many points and the circuit interfaces 306 and 309 separate, protocol termination is carried out in the data transceiver sections 331 and 334. In the utterance control circuit 353 one of the television conference terminals 302 or 305 It chooses, this is told to a control section 342, and an image and an audio bidirectional circuit are set up from the call control section 341 to the terminal with which the utterance was accepted. Furthermore, this selection result is also told to the voice addition distribution section 352, and issues addition directions of the sound signal from voice coding / decryption sections 321 or 324.

[0018] The example of a configuration of the voice addition distribution section is shown in drawing 3. Among drawing, 361,362,363,364 express a subtractor circuit and 365,366,367,368 expresses the loss insertion circuit corresponding to the number of communication link points. Moreover, 369 expresses an adder circuit.

[0019] For example, the sound signal which should be added inserts the loss of $\text{Log}(N-1)$ dB in N circuit **** case in order to suppress the rise of voice level. Since it is such, the approach of performing N-1 addition which excepts the voice from N addition and a self-terminal by all the adder units from each terminal, and is added as the voice addition approach is taken. Using this voice addition, as a direction, N-1 addition is performed to the terminal with which the bidirectional circuit was set up, and the result which carried out N (**) addition to the terminal with which it did not speak but the uni-directional circuit was set up is distributed.

[0020] Moreover, from the terminal with which the utterance demand was accepted, a speaker's video signal is transmitted from a camera, and it is distributed to each terminal which was changed in the image change distribution section 351 of the television conference control unit 300 between many points, and also includes an utterance terminal from it. In addition, since a bidirectional image circuit is set up to a speaker's terminal, it is also possible to display a self image and it is also possible to change and display on the image in the end of the other end.

[0021] The example of cross connection is shown in drawing 4. Drawing 4 (A) is the case where the both sides of the television conference terminals 302 and 305 advance an utterance demand, and shows this with a broken line. The bidirectional circuit (continuous line) is set up between the television conference terminals 303 and 304 and the television conference control unit 300 between many points. On the other hand, only the uni-directional circuit is set to terminals 302 and 305, and the same information is transmitted to the terminal side (distribution).

[0022] The condition that the television conference control device 300 between many points chose the

demand of the television conference terminal 305 between these two utterance demands, and drawing 4 (B) set additionally the bidirectional circuit by the side of the television conference terminal 305 is shown. In addition, by the television conference terminal 305 side, since the distribution circuit from the first has been set up, it is necessary to change this to the newly set-up voice circuit during an utterance here. The newly set-up voice circuit is added N-1 time with the television conference control unit 300 between many points.

[0023] The example of the utterance control circuit 353 is shown in drawing 5. 371 express the voice grant section among drawing, and 372 expresses the counter for monitor periods. To two or more utterance demands, the counter 372 for monitor periods checks the existence of a demand periodically, an utterance good signal is sent out to the data transceiver section 334 with the check of utterance exit status, and directions are taken out to a control section 342 so that directions of a cross connection addition in the cross connection to the utterance terminal 305, the image change distribution section 351, and the voice addition distribution section 352 may newly be taken out to the call control section 341.

[0024] Drawing 6 shows the example of a configuration of the image change distribution section which reduces and compounds the image concerning this invention. Among drawing, the contraction section and 411 express the matrix switch section, and, as for 412, 401,402,403,404 express the screen control section. The matrix switch section 411 in this drawing shows the condition of having spoken after the television conference terminal 305 acquires a voice.

[0025] The pixel of level in remaining as it is or the contraction section 401,402,403,404 and a perpendicular direction is taken every other piece, and the video signal decrypted from image coding / decryption section 311,312,313,314 is thinned out to one half, is sent to the matrix switch section 411, and in the matrix switch section 411, based on the control from the screen control section 412, the timing of a gate switch is adjusted and it is compounded.

[0026] For example, the gate (it corresponds to the gate of the box painted out black) of the video signal from image coding / decryption section 314 is carried out as it is, and image coding of the composite signal to the television conference terminal 302 is carried out in image coding / decryption section 311. Moreover, the gate of the video signal and the video signal from the television conference terminal 305 which thinned out the video signal from image coding / decryption section 313 in the contraction section 403 is carried out to the timing corresponding to the synthetic location on a screen as it is, it encodes in image coding / decryption circuit 312, and the composite signal to the television conference terminal 303 is transmitted to the television conference terminal 303. Similarly, also about the television conference terminal 304,305, the timing of the gate of the matrix switch section 411 is adjusted so that the screen of the chairman of the television conference terminal 303, the synthetic screen of the speaker of the television conference terminal 305, and the screen of the former speaker of the television conference terminal 304 may be displayed, respectively.

[0027] Drawing 7 shows the example of the synthetic timing of the gate of the matrix switch section 411. This drawing shows the timing which compounds the reduced screen of the television conference terminal 304 to the usual screen of the television conference terminal 305, when displaying on the television conference terminal 303. Composition is performed to the timing which is equivalent to the small screen part for every Rhine of each field as shown in this drawing.

[0028] Drawing 8 shows the example of an image screen display in each terminal. At the television conference terminal 302 As shown in (A), the usual screen of the speaker of the television conference terminal 305 is displayed. At the television conference terminal 303 As shown in (B), the screen which compounded the small screen of the former speaker of the television conference terminal 304 is displayed on the screen of the speaker of the television conference terminal 305. At the television conference terminal 304 As shown in (C), the screen which compounded the small screen of the speaker of 305 is displayed on the usual screen of the chairman of the television conference terminal 303, and as shown in (D), the former speaker of the television conference terminal 304 is expressed as the television conference terminal 305.

[0029] Thus, when performing a teleconference between the television conference terminals in two or more remoteness, while newly setting bidirectional image and voice circuit only to the terminal which

performed utterance control except the participant who speaks frequently, and acquired the voice A speaker's screen is compounded as it is, or the image of other chairmen, a former speaker, etc. can be reduced, synthetic distribution can be carried out, and, on the other hand, a meeting can be efficiently advanced now about voice N-1 addition or by doing N addition of and distributing.

[0030] In addition, although the above-mentioned example showed a speaker's display, the synthetic display of the image of a speaker and the former speaker who reduced, a chairman and the reduced synthetic display of a speaker's image, and a former speaker's example of a display It is easily realizable by changing timing adjustment of the matrix switch section 411 based on the directions from the screen control section 412 to compound two or more reduced screens in the same screen, to shift the location on a screen, or to change magnitude of a reduced screen.

[0031]

[Effect of the Invention] It becomes possible to be able to use the circuit of a uni directional effectively, and to attain communicative low cost-ization, and to raise the use effectiveness of a communication network by restricting those who speak frequently at the usual meeting to several persons, and controlling utterance sequence, since a large majority of men are hearers in many cases as explained above.

[0032] Moreover, by the synthetic display of a speaker image or a former speaker image by utterance control, a substantial participant's display is attained, the complicatedness of the display accompanying a screen change etc. is lost, and a teleconference can be advanced efficiently.

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TECHNICAL FIELD

[Industrial Application] This invention relates to the teleconference system between many points which communicates mutually through two or more image terminal groups installed in remoteness, and the node for the communication link between many points.

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PRIOR ART

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[0003] In drawing 9 (A), in 101,102,103,104, a television conference terminal and 110 express a digital communication network, and 111 expresses the television conference control unit between many points. Each television conference terminals 101-104 set up 64 kb/s digital bidirectional circuits, such as 2B+D, between the television conference control devices 111 between many points, and an image and a sound signal are delivered and received to each other between each terminal, and they perform a teleconference in this configuration. Here, digital communication networks 110 are communication networks, such as INS net.

[0004] The configuration of the television conference control unit 111 between many points is shown in drawing 9 (B). this drawing -- setting -- 201,202,203,204 -- a circuit interface and 211,212,213,214 -- in the image change distribution section and 232, the voice addition distribution section and 241 express the call control section, and 242 expresses [image coding / decryption section and 221,222,223,224 / voice coding / decryption section and 231] a control section.

[0005] In this configuration, bidirectional digital circuits, such as 64 kb/s, are set up based on the directions from the call control section 241 between each terminals 101-104 and the circuit interfaces 201-204.

[0006] It is separated by the circuit interface 201 and the image and sound signal from the television conference terminal 101 are decrypted in image coding / decryption section 211 and voice coding / decryption section 221, and based on the directions from each terminal, a video signal is the image change distribution section 231, and is changed to one video signal of the television conference terminals 102-104. With this, N-1 addition adding voice other than the end of a local is performed in the voice addition distribution section 232. While the changed video signal is again encoded in image coding / decryption section 211 and being transmitted to the circuit interface 201, it encodes in voice coding / decryption section 221, and it is transmitted to the circuit interface 201, and a sound signal is multiplexed, and is transmitted to the television conference terminal 101.

[0007] Actuation with the same said of circuit correspondence of the circuit interfaces 202-204 is performed. With in addition, the number of terminals which takes out directions to the call control section 241, or participates in this multi-point meeting in a control section 242 based on the meeting setting demand from the television conference terminal 101 so that cross connection of other television conference terminals 102-104 may be performed. The amount of loss insertion of the voice addition distribution section 232 is changed, or it changes to the image change distribution section 231 by the speaker detection function by the voice level monitor in the voice addition distribution section 232, and directions are issued, and it points so that a speaker screen may be displayed.

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EFFECT OF THE INVENTION

[Effect of the Invention] It becomes possible to be able to use the circuit of a uni directional effectively, and to attain communicative low cost-ization, and to raise the use effectiveness of a communication network by restricting those who speak frequently at the usual meeting to several persons, and controlling utterance sequence, since a large majority of men are hearers in many cases as explained above.

[0032] Moreover, by the synthetic display of a speaker image or a former speaker image by utterance control, a substantial participant's display is attained, the complicatedness of the display accompanying a screen change etc. is lost, and a teleconference can be advanced efficiently.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] As explained above, by the conventional video conference system between many points, the bidirectional circuit was always set up between each terminal and the television conference control unit between many points, and since the sound signal and the video signal were always transmitted to the television conference control unit between many points from the terminal which has not spoken, or the terminal which is not seen, respectively, there was a problem that the utilization ratio of a transmission line was low. Moreover, since only the speaker was displayed when a speaker change was performed, there was a problem that a dialogue with a chairman and relation with a former speaker were unclear.

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MEANS

[Means for Solving the Problem] In order that this invention may solve the above-mentioned technical problem, it is the thing which enabled it to use a communication network efficiently using the uni-directional circuit of communication networks, such as broadband ISDN, and its distribution frame. While being and using a uni-directional circuit setting up function for the television conference control unit between many points By controlling assignment of those who introduce an utterance control function and speak, displaying a speaker or giving a synthetic indication of a chairman or the former speaker, a uni-directional circuit is used effectively and a screen display of a speaker's dialogue situation is carried out.

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OPERATION

[Function] Since a bidirectional circuit is always set up in a speaker's display in the teleconference system between many points of this invention between the terminal which participates in a meeting, and the television conference control unit between many points While setting up a uni-directional circuit in addition to those who speak that there is nothing and frequently So that the bidirectional circuit which yielded and set the voice additionally to other terminals may be cut if only the terminal with which utterance control was performed and the voice was accepted sets a bidirectional circuit additionally and an utterance finishes it, and cross connection may be carried out to other utterance terminals It carries out and is made to give a synthetic indication of the image of not only a speaker's image but a chairman or a former speaker.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is an example of the television conference configuration between many points concerning this invention, and is drawing showing one example of a connection configuration with a communication network.

[Drawing 2] It is drawing showing the example of a configuration of the television conference control unit between many points in this invention.

[Drawing 3] It is drawing showing the example of a configuration of the voice addition distribution section.

[Drawing 4] It is drawing showing the example of the cross connection by the example of this invention.

[Drawing 5] It is drawing showing the example of an utterance control circuit.

[Drawing 6] It is drawing showing the example of a configuration of the image change distribution section.

[Drawing 7] It is drawing showing the example of the synthetic timing of the video signal of the matrix switch section concerning the example of this invention.

[Drawing 8] It is drawing showing the example of an image screen display in the television conference terminal by the example of this invention.

[Drawing 9] It is drawing showing the example of the conventional television conference system between many points.

[Description of Notations]

300 Television Conference Control Unit between Many Points

301 Digital Communication Network

302-305 Television conference terminal

306-309 Circuit interface

311-314 Image coding / decryption section

321-324 Voice coding / decryption section

331-334 Data transceiver section

341 Call Control Section

342 Control Section

351 Image Change Distribution Section

352 Voice Addition Distribution Section

353 Utterance Control Section

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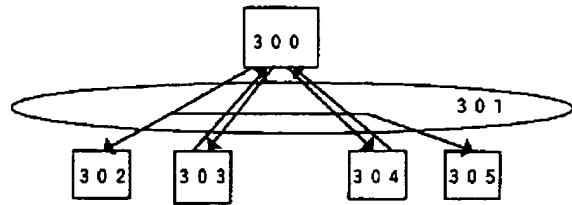
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DRAWINGS

[Drawing 1]

本発明の多地点間テレビ会議構成例



300 : 多地点間テレビ会議制御装置

301 : ディジタル通信網

302 ~ 305 : テレビ会議端末

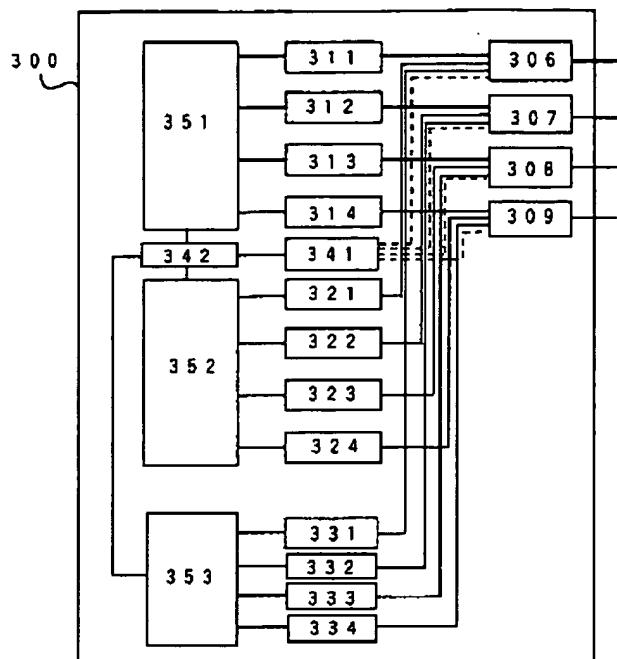
300: Television conference
control device

302 ~ 305: TV conference
terminal

[Drawing 2]

Drawing 2

本発明の多地点間テレビ会議制御装置構成例



306~309: 回線インターフェース

341: 呼制御部

311~314: 映像符号化・復号化部

342: 制御部

321~324: 音声符号化・復号化部

351: 映像切替分配部

331~334: データ送受信部

352: 音声加算分配部

353: 発言制御部

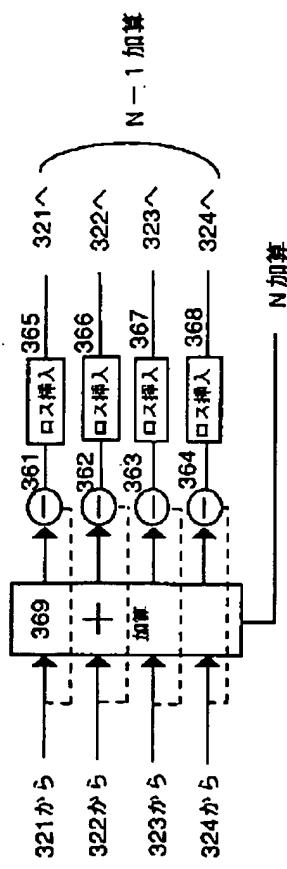
341: Call control section

h

c g cg b eb cg e e

Drawing 3

音声加算分配部の構成例



361~364: 算算回路 365~368: ロス挿入回路 369: 加算回路

[Drawing 4]

h

c

g

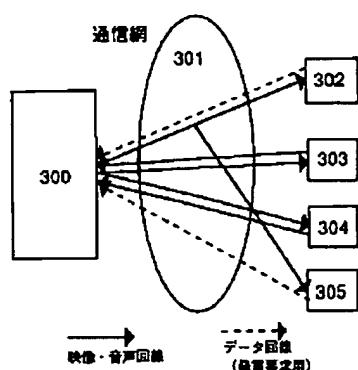
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eb cg e e

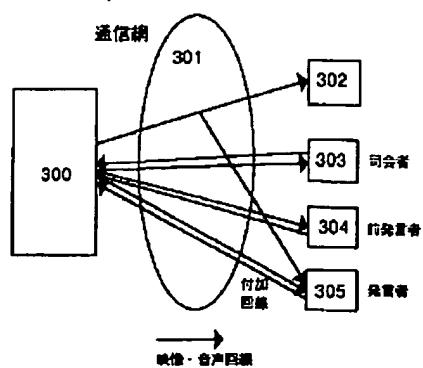
回線設定の例

Drawing 4

(A) 発言要求時



(B) 発言権獲得後発言時



$$\begin{aligned}
 m &= 2 \times 2 + 2 \\
 &= 6
 \end{aligned}$$

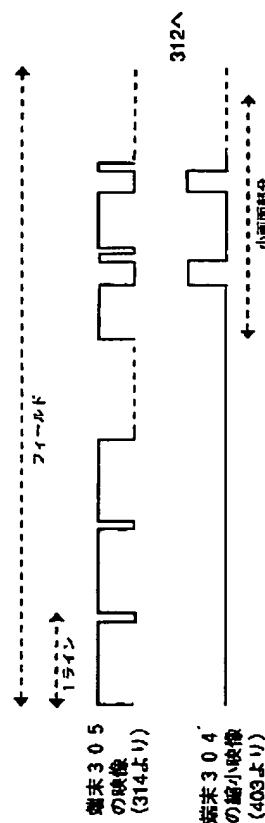
[Drawing 7]

h

c g cg b

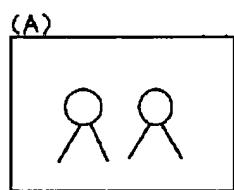
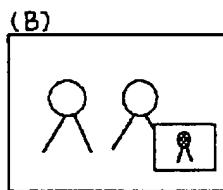
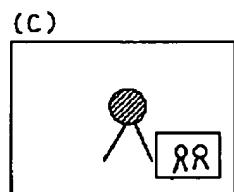
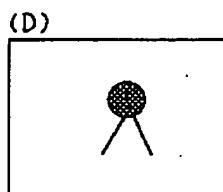
eb cg e e

マトリクススイッチの映像信号の合成タイミングの例



[Drawing 8]

映像画面表示例

発言者画面
(端末 302)発言者映像合成画面
(小画面は前発言者)
(端末 303)司会者映像合成画面
(小画面は発言者)
(端末 304)前発言者画面
(端末 305)

[Drawing 5]

h

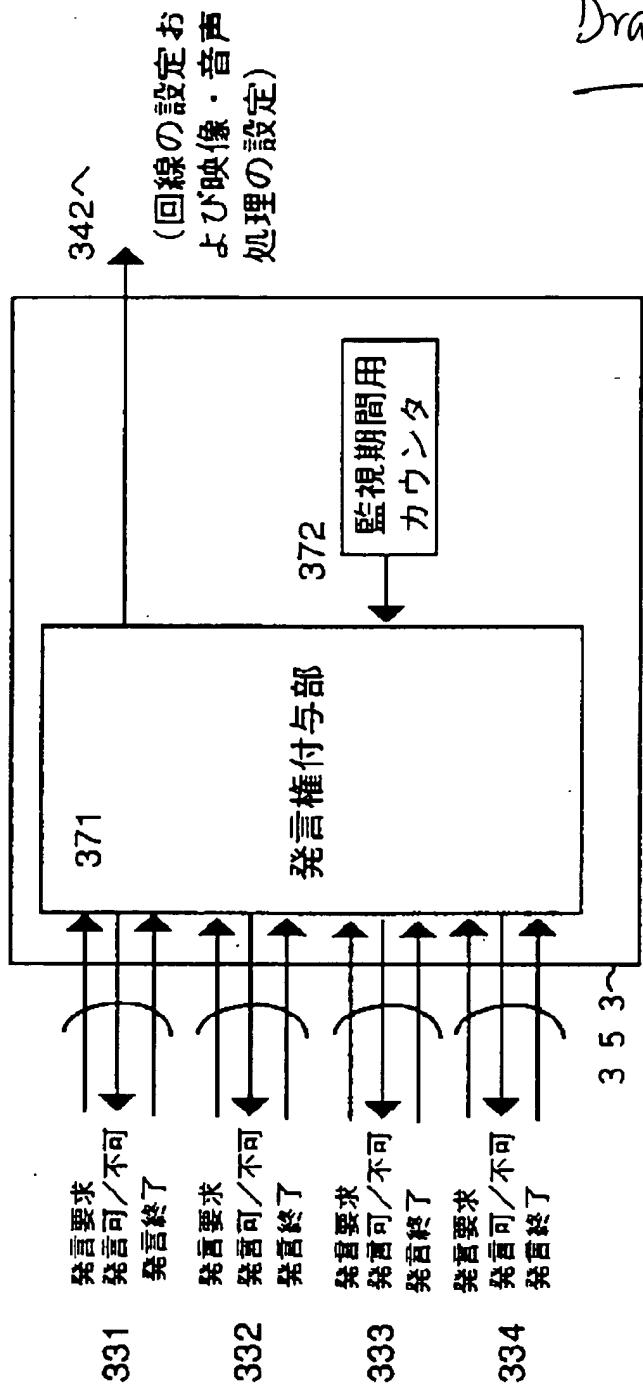
c

g

cg b

eb cg e e

発言制御回路例

Drawing 5

[Drawing 9]

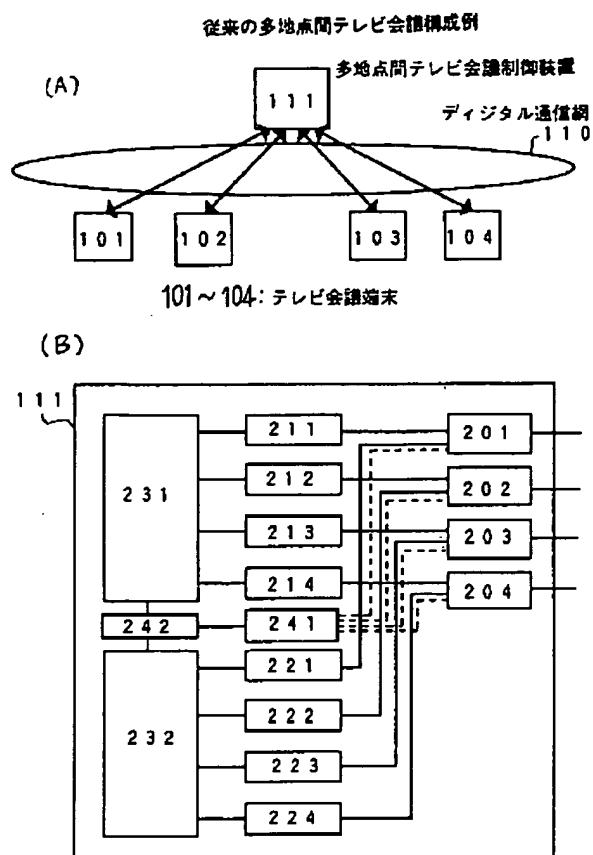
h

c

gg

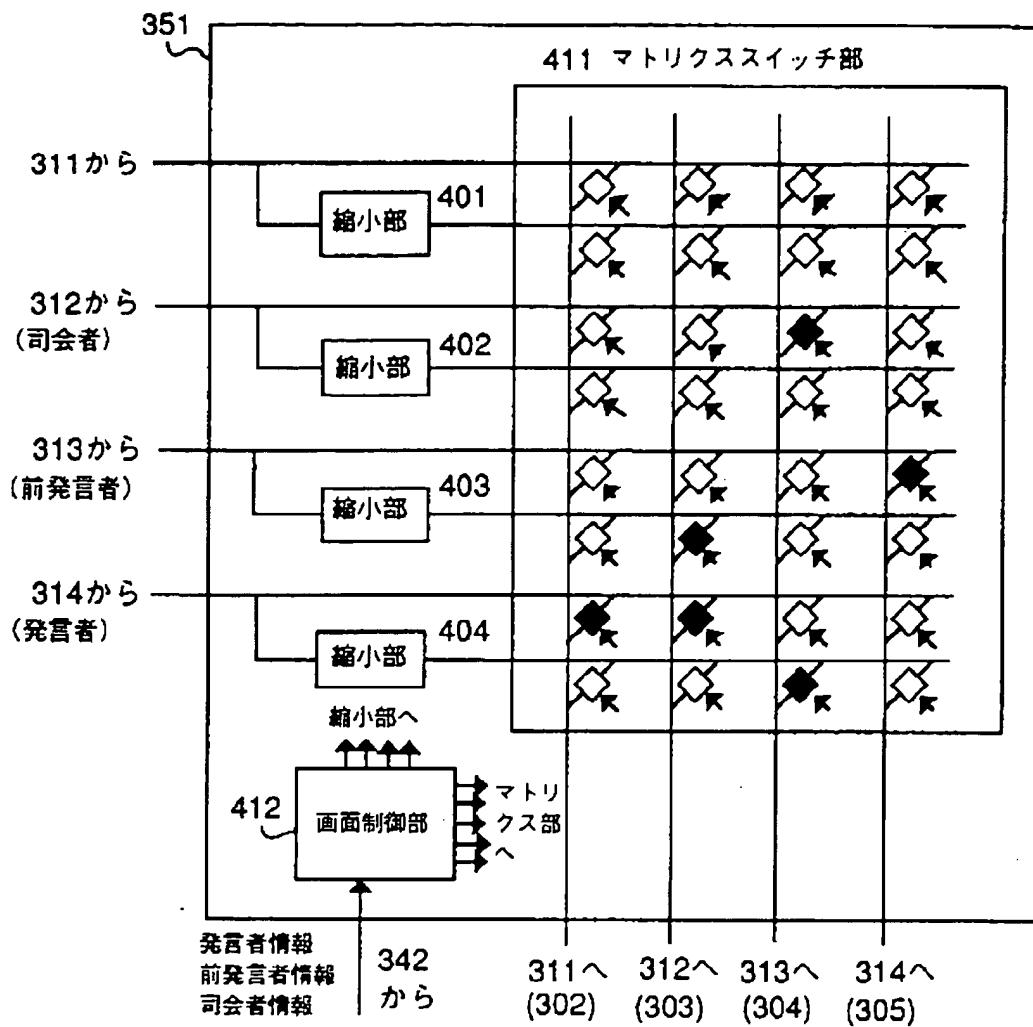
cg b

eb cg e e



[Drawing 6]

映像切替分配部の構成例



[Translation done.]

h

c g cg b

eb cg e e

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